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leaves are placed in  $n/1000$  acid for 24 hours, and then treated with caffeine solution, no tannin is precipitated; while the controls kept in water show a heavy precipitate. The acid solution showed a strong tannin test with iron salts. CZAPEK concludes that the acid renders the *Plasmahaut* permeable to tannins, and that they gradually diffuse out. In strong acids he finds  $n/6400$  the critical (minimum) concentration for inducing marked permeability. This is the concentration at which KAHLBERG and TRUE found growth to cease. CZAPEK believes the stoppage of growth is directly due to reduced turgor, resulting from the induced permeability of the protoplasm to contained substances. He recognizes that injuries appear in concentrations below the critical concentration for permeability. Various other substances give similar results. The critical concentration for phenol is 0.58 per cent or  $n/16$ ; for resorcin, di-hydric phenol, 2.85 per cent or  $n/4$ ; for pyrogallol tri-hydric phenol  $n/4$ . Among alcohols, the critical concentrations were methyl 15 per cent, ethyl 10-11 per cent, normal and iso-propyl 4-5 per cent, iso-butyl 1-2 per cent, amyl 0.5 per cent. In acetic acid the critical concentration is below that determined by its acid properties. The effect of external conditions upon the permeability of protoplasmic and other plant membranes is a subject that deserves much attention from plant physiologists. Animal physiologists are teaching us much in this field.—WILLIAM CROCKER.

**Morphology of *Sciadopitys*.**—LAWSON<sup>10</sup> has published an account of the gametophytes and embryo of *Sciadopitys*, one of the peculiar conifers of eastern Asia. The microspores are binucleate at shedding, and are received upon the so-called pollen cushion, which is the tip of the nucellus differentiated into a loose tissue of large thin-walled cells. During the first season only one more division occurs, that of the generative cell into the body cell and a free stalk nucleus. In the next season the body cell passes toward the tip of the pollen tube, which has entered an archegonial chamber, and there produces two unequal male nuclei. The formation of the megaspore tetrad is peculiar. The division of the mother cell nucleus is not accompanied by wall formation; but the subsequent division of the two daughter nuclei is; so that the tetrad comprises three cells, the middle one of which is binucleate. In these divisions the chromosome numbers prove to be 8 and 16. The innermost megaspore is the functioning one, enlarging very much, and becoming invested by the usual zone of nutritive cells. The female gametophyte is developed as in the majority of conifers, and there are four or six archegonia, each with its own investment of jacket cells and a deep archegonial chamber. A ventral nucleus is formed, but no ventral canal cell. In the development of the embryo, the free nuclei pass to the base of the egg at the four-nucleate stage, and the proembryo finally consists of three tiers of cells and one tier of free nuclei toward the egg cytoplasm. The middle tier of cells becomes the suspensor, while the embryo-forming tier becomes a mass of at least sixteen cells.—J. M. C.

<sup>10</sup> LAWSON, A. ANSTRUTHER, The gametophytes and embryo of *Sciadopitys verticillata*. *Annals of Botany* 24:403-421. pls. 29-31. 1910.